DOCUMENT RESUME

ED 130 569 HE 008 329

AUTHOR	Fink, C. Dennis; Bushnell, David S.
TITLE	The Development of an Action Plan for a Post-Graduate School of Occupational Health.
INSTITUTION	Human Resources Research Organization, Alexandria, Va.
SPONS AGENCY	Occupational Health Inst., Chicago, Ill.
REPORT NO	HumRRO-FR-ED-76-15
PUB DATE	Jul 76
NOTE	91p.
AVAILABLE FROM	Human Resources Research Organization, 300 North Washington St., Alexandria, Va. 22314
EDRS PRICE	MF-$0.83 HC-$4.67 Plus Postage.
DESCRIPTORS	Certification; Course Content; Curriculum Development; Educational Finance; Educational Objectives; Evaluation; Governance; *Health Education; Health Occupations; Health Personnel; *Higher Education; *Medical Education; Medical Schools; Occupational Diseases; *Physicians; *Post Doctoral Education
IDENTIFIERS	*Occupational Health

ABSTRACT

Despite the growth in interest and concern for occupational health, few formal programs in occupational medicine exist. Most physicians practicing in the field have had to pursue their post-graduate education on a piecemeal basis with short-term workshops and self-study programs. Recognizing the need for systematically meeting the post-graduate educational needs for occupational health physicians, the Occupational Health Institute has sponsored the development of a plan based on the outline of Irving R. Tabershaw, M.D. The proposed characteristics of the Post Graduate School of Occupational Health (PGSOH) are discussed, including the mission, educational goals, selection of students, instructional content, instructional delivery system, evaluation techniques and procedures, certification requirements, relicensure, techniques for ensuring that courses are job relevant, techniques for updating course content, and procedures for assuring school credibility. The school organization and governing body are outlined, including the organizational structure, governance, recruitment of professors and course developers, proposed location, and incorporation as a nonprofit institute. The five phases of institutional development are detailed as are the expenditure and revenue projections. (JMF)

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Prepared by

C. Dennis Fink and David S. Bushnell

HUMAN RESOURCES RESEARCH ORGANIZATION
300 North Washington Street • Alexandria, Virginia 22314

HE 007 329

July 1976

Prepared for

Occupational Health Institute
150 North Wacker Drive
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FOREWORD

The physical and mental well being of a modern society depends in large measure on the quality of the environment in which we live and work. By ensuring the safety and health of workers in all walks of life, the benefits derived from gainful employment take on a new dimension. In recent years, teams of safety engineers, industrial hygienists, and occupational physicians have worked with employers and employees to strengthen existing programs and to initiate new ventures . Recently enacted Federal laws and regulations have helped to underscore the importance of occupational safety and health programs.

Paralleling the growth in interest and concern for occupational health has been the demand for well qualified occupational physicians. Those physicians certified as specialists in their field receive their training at the post-graduate level. Unfortunately, few formal programs in occupational medicine exist. Moreover, most physicians who now practice in the field of occupational medicine have not had the opportunity to take formal courses in many of the subjects which comprise their field of study. Therefore, they must pursue their post-graduate education on a piece meal basis, turning to short-term workshops and self-study programs when available.

Schools of Public Health cannot afford to develop programs of occupational medicine for what are currently small groups of potential students. In the absence of government support, few occupational health programs currently exist. On the other hand, occupational health physicians are not attracted to existing programs in occupational medicine because they cannot afford to take a year or two off from their practice. Thus, the education of occupational health practiti ners is at an impasse. A large portion of the potential student body for

occupational health programs cannot (or are unwilling to) meet the residency requirements such programs impose. The development of new programs cannot be justified because the potential student body is too small.

Recognizing this dilemma, the Occupational Health Institute has concluded that it is up to the OHI and the companies it represents to develop a program for systematically meeting the post-graduate educational needs of occupational health physicians. In recent years, the features of such a system have been discussed by the OHI Board of Directors, and an outline of the post-graduate school has been developed by Irving R. Tabershaw, M.D.

In 1975 the OHI Board of Directors agreed that the development of a post-graduate school should be investigated further. In January 1976, the OHI entered into a contract with the Human Resources Research Organization, Alexandria, Virginia, for the development of an Action Plan for a post-graduate school of occupational health. That Action Plan is the subject of this report. The plan is based on the premise that mid-career occupational health physicians would be willing to pursue their post-graduate education in large part through self-instructional techniques.

The authors of this report wish to acknowledge the interest, enthusiasm and support of Irving R. Tabershaw, M.D., and Duane L. Block, M.D. A number of features of the Action Plan are similar to those initially proposed to OHI by Dr. Tabershaw. Dr. Block has been very helpful in providing overall guidance for the effort and for his critical review of the draft report. We also wish to express our appreciation to the OHI Board of Directors for their comments and suggestions regarding the action plan.

In the field of continuing education, there are a number of persons who have had a long standing interest in non-traditional degree programs of

the type proposed in this report. Four of these persons kindly consented to review the draft report and their comments proved to be extremely useful. These persons were: James Broschart of the U.S. Office of Education, Arthur Chickering of Empire State College, Bruce Hamilton of the Educational Testing Service, and Normand Kurland of the State University of New York. The views and recommendations expressed herein are solely those of the authors, however, and should not be attributed to those commentators and reviewers sighted.

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Alexandria, Virginia
July, 1976

THE DEVELOPMENT OF AN ACTION PLAN FOR A POST-GRADUATE SCHOOL OF OCCUPATIONAL HEALTH

INTRODUCTION

The evolution of occupational medicine in the United States as a medical specialty from its earlier concern for the factory worker to its current focus on workers at all levels in almost every industry reflects the growing responsibilities of physicians in this field. Buttressed by the early passage of the Workman's Compensation Insurance and the more recent occupational safety and health legislation, employers and labor representatives alike rely upon the occupational physician for guidance and assistance in implementing or improving programs designed to protect and enhance the safety and health of our nation's work force. Assessing, maintaining, restoring and improving worker health through the practice of preventive medicine, emergency medical care, rehabilitation, industrial hygiene and toxicology, and the promotion of safe work practices illustrates the range of the occupational physician's needed skills and knowledge.[1*] The expanded responsibilities and improved status of the occupational physician contrasts favorably with the image of the "company doctor" of a few decades ago.

Today's executives ignore company health programs at their own, and the organization's, peril. Judges are holding employers not only responsible for the health of their employees but for the safety of their products as well. The mandatory requirements of the Occupational Safety and Health Act of 1970, together with private industry's own efforts to establish standards for judging the adequacy of company safety and health programs, have led employers to set

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* See page 6-1 for the listing of references and footnotes.

correspondingly high standards in their search for medical directors and plant physicians. Physicians currently practicing in the field of occupational medicine, or those aspiring to practice in this specialty, have discovered that keeping up to date or becoming certified in occupational medicine is not easily achieved.[2] Self-assessment and recertification programs in other medical specialties have demonstrated the feasibility of providing continuing medical education in a way which is both cost-effective and learner-oriented.[3] Occupational physicians, faced with a burgeoning array of work related problems -- ranging from monitoring the effects of new chemicals and potential carcinogens to the rehabilitation and placement of handicapped workers -- require more than short courses and self-assessment examinations. For many their need for new knowledge and skill demands a full program of post-graduate courses closely linked to industry requirements. Improving and maintaining the quality of working life in America requires just such a commitment.

The Need. While there has been no definitive assessment of the current demand for specialists in occupational medicine, a recent survey of company health programs by the Conference Board[4] estimates that 13,800 full and part-time occupational and plant physicians, together with an army of safety engineers, industrial hygienists, and nurses, are employed by companies with 500 or more workers. The Conference Board study concludes that out of the nation's 80 million workers approximately 20 million are employed by companies with full or part-time physicians. The National Institute of Occupational Safety and Health estimates that 28,000 full and part-time physicians are needed by industry to comply with the standards set by the Occupational Safety and Health Act (OSHA).[5] This gap between supply and demand underscores the timeliness of this proposed action plan for a Post-Graduate School of Occupational Health (PGSOH).

In spite of this apparent shortage, there are relatively few occupational medical residency programs in the United States. At the present time, four accredited occupational medicine programs offer approximately 30 residencies each year.[6] The number of such opportunities has actually declined in recent years due largely to HEW's cut back in subsidies for schools of public health and medicine.[7]

Even the existing academic occupational medicine programs do not lay great stress on preventive medicine. They tend to emphasize the diagnosis and treatment of illness. In addition, many of the students currently enrolled come from families with professional backgrounds who have little knowledge or experience with the health hazards of the work place. Learning to work for, and with, other occupational health professionals, such as industrial hygienists, toxicologists, and epidemiologists is in itself an important skill requirement of the organizationally-based occupational physician.

Given the limited capacity for the training of new occupational physicians and the shortage of experienced practitioners, companies wishing to recruit such specialists must look to those already employed or to those physicians in related specialties who wish to transfer into the field. Many companies elect to promote their plant physicians to medical director status, few of whom are Board certified as occupational physicians. Employers and union officials are looking for subspecialists who are not only knowledgeful of OSHA and workman's compensation laws and willing to oversee company or union sponsored safety and health programs, but are capable of building and maintaining good relationships with internal leadership and external agencies and community resources.[8] Helping interested physicians to qualify is, of course, the purpose of this exploratory study.

Access Barriers. Industry, union and governmental needs for well-trained occupational physicians happily coincides with an apparent increase of interest

on the part of practicing physicians and those from related fields in qualifying as occupational health specialists. Practicing physicians are, however, understandably reluctant to take time away from their current practices to acquire the necessary background and training to qualify as occupational physicians.

If a practicing physician elects to give up his practice in order to enroll in an accredited post-graduate program of occupational medicine, he not only has to forego the income he might have earned had he remained in practice, but he is often confronted with tuition charges averaging $4,000 to $5,000 a year.

The American Board of Preventive Medicine (ABPM) sets as its requirement an additional year of study in the field of occupational medicine following completion of the MD degree. Field experience can be substituted for academic experience, although it requires considerably more than a year to satisfy the minimum eligibility requirements through this route.

Even if one is willing to make the necessary monetary sacrifices and invest the time needed to become certificated, there are still other barriers to be surmounted. For purposes of our discussion, these barriers can be grouped as institutional, personal and social barriers.

Kurland and Comly[9] observe that few higher educational institutions provide flexible continuing education programs for professionals. Instead of recognizing the significant differences in learning styles between older students and those who are more typically of college age, universities often fail to adapt their teaching procedures and requirements to the needs of mature adults.[10] The conforming, more pliable, and inexperienced 20 year old does not expect nor demand an egalitarian approach to education which some adult oriented continuing education programs have been able to achieve. But even those programs which cater to adults fall victim to bureaucratization as they rigidify and become over-

institutionalized in the interest of self-preservation. Pioneering efforts need legitimacy if they are to succeed in their struggle for an adequate funding base.[11] Additionally, continuing education programs are frequently required to be entirely self-supporting, thereby rendering them accessible only to the affluent student, and forcing them to be hypersensitive to changing economic conditions.

Other institutional barriers cited by Broschart[12] as tending toward the exclusion of adults from enrollment at higher educational institutions are: (1) controls on how, when and where registration takes place, (2) harsh dollar penalties for failure to comply with many requirements originally designed to be met by full-time residential students, (3) lack of parking facilities and public transportation, and (4) lack of food services, health care, and even access to libraries. Such is often the plight of the part-time, adult student.

Personal barriers frequently take the form of inadequate or unavailable counseling services, absence of procedures to give credit for prior experience and knowledge, lack of time and money, and the lack of motivation.

Social barriers can be both formal and informal. Informal barriers reflect society's attitudes toward continuing education. Many people still view adult education as primarily remedial in nature. Many professional educators look upon the formal years of education as preparation for life. What comes after, in their view, can only be for those who didn't make it the first time around. Such a perspective when applied to practicing physicians is, of course, ludicrous. Any professional who wants to modify his area of specialization at mid-career or up-date his knowledge in his chosen field should be able to do so without being penalized.

Formal social barriers are often the product of those informal views. Few federal and state legislators see the need to support adult learning programs, and when they do, it is usually because of some particular manpower shortage. Hence such programs tend to be catagorical and lack coordination or comprehensiveness. Even existing legislation supporting a broad array of adult programs impose numerous restrictions on enrollment, eg., age and sex restrictions, geographical or local residency requirements, no tuition or cost assistance, and little in the way of publicity or promotional support efforts.[13]

This brief review of the barriers confronted by adults, even professionals, when attempting to gain access to continuing educational opportunities sets the stage for the recommendations that follow. Many are designed to circumvent or eliminate those conditions which might otherwise hinder or frustrate the career preparation of the aspiring occupational physician.

PROPOSED CHARACTERISTICS OF THE POST-GRADUATE SCHOOL OF OCCUPATIONAL HEALTH (PGSOH)

The general characteristics of the Post-Graduate School of Occupational Health are shown in Table I and are discussed in more detail in the following paragraphs. These recommended characteristics were the result of an extensive review of the literature on adult learning and a careful specification of the learning system requirements of the occupational health physician in mid-career. Some of the background considerations which led to the selection of these characteristics are described in Appendix A.

Mission

The primary mission of the School would be to provide a means whereby mid-career physicians working or interested in occupational medicine can receive high quality instruction and can receive educational credit for demonstrable competencies in various areas of occupational medicine.

Educational Goals

The four educational goals of the School concern the provision of educational experiences that can: (a) instruct physicians regarding skills, knowledges, and techniques related to occupational medicine; (b) prepare physicians to qualify for specialty Board examinations in occupational health; (c) prepare physicians for recertification; and (d) provide a variety of educational experiences which can be used to meet relicensure requirements.

In addition to the above educational goals the School would have the objective of serving as a resource for information on the latest developments in occupational medicine.

Table I GENERAL CHARACTERISTICS OF THE POST-GRADUATE SCHOOL OF OCCUPATIONAL HEALTH

1. A free standing institution which will provide an External Degree Program in Occupational Health.
2. Instruction will be provided in five core courses plus a number of elective courses.
3. The instructional programs of other institutions will be utilized by:
   a. honoring credits obtained at other institutions.
   b. helping students enroll in other institutions, when appropriate.
4. Credit will be awarded for prior work and professional experiences.
5. Instruction will be based on the use of self-instructional material supplemented by orientation and review sessions.
6. Course credit will be awarded primarily on the basis of examinations.
7. Course work will be individualized.
8. Self-assessment procedures will be extensively employed.

For convenience the educational continuum may be subdivided into five sections or processes -- selection, instruction, evaluation, certification (degree awarding), and continuing education. The following sections contain a brief description of how each of the processes would be treated by the PGSOH.

Selection of Students

1. Clientele: Physicians with a primary or secondary specialty in occupational medicine, and, other persons directly associated with the field of occupational medicine, including representatives from industry, labor and pertinent government agencies. More specifically, the clientele would consist of:
   a. Physicians who currently function as medical directors of an organization or as a plant doctor;
   b. Private practitioners interested in occupational medicine, especially those who serve as part-time plant physicians.
   c. At some future time, other persons interested in occupational medicine -- nurses, industrial hygienists, health physicists, safety engineers, toxicologists, health administrators -- may be invited to enroll in selected courses. Such persons would not be eligible for a diploma.
2. Prerequisites:
   a. For a diploma-producing program: a medical degree plus a minimum of three years of post-graduate professional experience in occupational medicine either as a full-time medical director or as a full- or part-time plant physician.
   b. For non-diploma students: evidence of acceptable undergraduate or graduate work which would qualify them for the course of instruction

they propose to undertake; current employment in a field directly related to occupational health; and five years of experience in job positions related to occupational health. Students in this category may not have an M.D. degree.

3. Client Restrictions: The PGSOH would be designed primarily for physicians who are practicing in the field of occupational medicine. It is proposed, therefore, that during the first five years of the School enrollment be restricted to such persons. Once the School has become firmly established it may be appropriate to allow non-M.D.'s to enroll in the School for the purpose of taking specific courses.

Instructional Content

The PGSOH would present five core courses of instruction. These would cover the areas of industrial toxicology; epidemiology, biostatistics and research design; clinical occupational medicine; industrial hygiene; and the administration of occupational health programs. A number of additional courses on subjects not yet identified would be developed also.

1. Course Format. A course of instruction might consist of 18 modules, each module requiring an average of 7½ hours of study and examination time to complete. To receive 3 credits for the course a student would be required to demonstrate mastery of the skills and knowledge related to 12 modules, or, a set of modules which collectively require about 87 hours of study and examination time to complete. In addition, the student would be required to attend a seven-hour course orientation session, one or both seven-hour review sessions and two six-hour School-administered final exams. One exam would be given mid-course and the second at the completion of the course. Thus, to

complete a three-credit course the average student would expend about 120 hours.

As currently perceived most if not all courses would contain core or required instructional modules plus elective modules. By this means each course could be partially individualized in order to meet the particular needs of each student. Other course characteristics would be as follows:

a. The student, with the advice of a counselor, would select that group of modules most applicable to his educational goals. If the student was preparing for the American Board of Preventive Medicine examination a selected core of modules would be recommended for study.

b. A student would be allowed to demonstrate mastery of the material contained in a module without first studying the module-related material. That is, if a student felt that he already knew the material to be covered in the module, he would be allowed to take a test on this material. If he passed the test he would receive credit for that module. If he failed, he would be required to study the module then pass a second test covering the training objectives of that module. Other procedures for receiving credit without studying course material are discussed under the system titled "Evaluation."

c. The format for a three-credit course might be as follows:

(1) A one-day course orientation period to familiarize the student with course requirements, the nature of the instructional

material to be used during the course, the nature of course evaluation procedures, counseling and other services provided by the School and so on. Such services and orientation may be scheduled at the school or at more accessible regional locations.

(2) Study of the modules which comprise the first half of the course. Such study would be carried out at home or in a nearby college. After study of each module an end-of-module test would be taken and returned to the School for corrections. If the student passed the test he would be sent the next module of instruction. If not, the failed examination would be returned to the student with specific suggestions as to how to restudy the module material. After further study the student would take a second end-of-module test. Assuming that he passed the test, he would then be sent the next module of instruction.

(3) A two-day mid-term session. This session would be scheduled at a regional center or nearby college to provide counseling and an opportunity for the enrollees to review and discuss course content with a small group of other enrollees. An examination then would be administered covering the first half of the course. This examination would consist of a sample of questions taken from the pre- and post-tests of the modules studied, plus additional questions.

(4) Individual study of additional modules. These would comprise the second half of the course.

(5) An end-of-course one-day review similar to that held at mid-term followed by an examination over the second half of the course. This would complete the program of study.

d. It is presumed that certain courses, or perhaps all core courses, would contain one or more rather lengthy exercises or projects which could be undertaken in lieu of the study of instructional modules. A few modules might consist almost entirely of such exercises or require the conduct of an extensive project.

e. Optional Seminars. Following completion of one-fourth and three-fourths of each course a student would be given the option of attending a one-day seminar covering the prior fourth of the course material. The seminar would be conducted by the course developer at a suitable location. The seminar would probably be held on a weekend. Each student would pay his own travel and per diem costs and a registration fee of perhaps thirty dollars. The seminar would not be held unless a minimum number of students (six?) signed up for the seminar.

2. Regional Sessions and Work-Site Visits. At various times during the year School instructors would gather at six to ten regional locations for the purpose of visiting with students, providing counseling services, holding review sessions, and conducting examinations. Within limits, any student would be allowed to attend a session held at another region.

a. Students would be allowed to take course examinations without first attending a regional group discussion session. However, we believe that such discussion sessions play an important role in the instructional process. Therefore, each student would be

required to attend one discussion session per course in order to receive course credit.

b. During their regional visits instructors would visit the work site of those students conducting projects or exercises.

3. Field/Project Work. As part of each program of study a certain amount of field/project work would be required. Such work might include the conduct of an epidemiological study, the development of a data collection and recording system for the early identification of hazards, the preparation of a professional paper or journal article, a literature review, or the preparation of an instructional module which might be incorporated into one of the School's courses.

4. Student Counseling. Before matriculating into the School a student would meet with one or more counselors in order to determine their educational goals and whether or not they could be met by enrollment in the School. Assuming this were found to be so, the counselor and student would identify as precisely as possible the educational goals of the student, how these goals were to be met, and the general schedule for meeting the goals. Planning and counseling sessions would identify those competencies already possessed by the student. At the student's option he could be examined over these competencies and course credit awarded for those sections of the total examination which had been passed by the student. Enrollment at other institutions might be recommended as one way of satisfying all or portions of the requirements of a particular course. The student would be queried regarding recent work experiences, professional activities and products in order to identify those which might be the basis for awarding certain amounts of course credit.

The counseling and planning sessions would eventuate in a decision to or not to enroll in the School. A decision to enroll would be followed by the preparation of a learning contract describing the overall educational goals of the student and the general program to be followed by the student. Additional more specific learning contracts would be prepared for each course of instruction.

5. Preparation of Learning Contracts. Prior to undertaking each course, the student and his counselor would work out in detail the instructional modules to be studied and in what sequence, the projects to be completed, and the time schedule for completing the course. Agreements would be reached regarding what types of prior experiences and projects, if any, would be considered for course credit. Also, an agreement would be concluded which described how course work would be assigned. These agreements would be formalized by the preparation of a Learning Contract between the student and the School. A number of institutions now employ learning contracts as a way of defining more precisely student and School procedures and expectations.

A Learning Contract is a statement of agreement between student and counselor. It includes a statement of the general, overall, long-term purposes that the student has for his education and his diploma program; a statement of specific objectives or specific expected outcomes; a description of the learning activities the student will enter into; a description of the learning approaches to be used, eg., books to be read, tutorial work, self instructional modules to study, and so on; a listing of the human and other resources that the School commits itself to provide in support of a student's learning activities; a

statement describing the means and criteria that will be used in evaluating student performance; the amount of credit that will be awarded for accomplishing various learning activities while enrolled in the School; and a description of the types of prior activities and products that will be considered for credit, how these activities and products will be evaluated and the maximum amount of credit that might be awarded.

Incorporating the above information into a learning contract, particularly information relating to methods and criteria evaluation, makes it possible for the prospective student to know in advance what is expected of him. If he questions or disagrees with the proposed evaluation plan, he can register his concern at that time. The final contract must be one that both the student and his counselor can agree on.

From time to time students will break their learning contract. When this first occurs the student would have the option of withdrawing from the School or of rewriting his contract. If the contract is broken a second time the same options would previal. After breaking the contract for a third time a committee of counselors would meet with the student and review the conditions which prevented the student from completing his contract. If these conditions were found to be under the control of the student, he or she would be asked to withdraw from the School.

Instructional Delivery System

1. Use of Syllabi and Instructional Modules. Each course would be developed around a detailed syllabus supported by a large number of instructional modules. Many of the modules would be supplemented by projects and field exercises, some required while others would be optional.

   Each instructional module would contain:

   (1) a series of training objectives

   (2) a statement of the rationale for studying that particular module

   (3) a pre-test (some modules might not contain this)

   (4) instructional reference material

   (5) a workbook and/or self-assessment exercise

   (6) an end-of-module examiantion to be graded by the School

2. Course Length. Approximately 40 hours of study and examinations would constitute one credit hour. This is comparable to the definition of "one credit" used by many institutions of higher learning. For each module, estimates would be made regarding the amount of time an average student might need to master the training objectives of the module and to complete the necessary examinations.

3. Instructional Devices and Procedures. In most instances instructional content would be presented by print media (assigned readings) but would be supplemented when appropriate by audio and/or video cassettes, by programmed instructional packages (if already in existence) and by slides. Multi-media instructional packages sometimes would be employed, especially when already developed packages could be obtained. An effort would be made to use existing material in order to reduce the cost of

developing new material. Each course would include an orientation period, a mid-term review and examination period, and an end-of-course review and examination period.

Evaluation Techniques and Procedures

It is contemplated that credit would be awarded for a variety of educational and work experiences, to include:

1. Passing an examination over PGSOH course material. Each course module would contain an end-of-module examination which would be scored by the School. The mid-term and end-of-course exams would be based on a sample of questions taken from the pre- and post-tests for each module. On a course by course basis other examination techniques could be employed so long as at the beginning of the course the student had been informed completely about the examination procedures to be used at various stages of the course.
2. Examination of products produced and/or activities engaged in during the process of the course. Credit would be awarded for assigned field work and for the satisfactory completion of various types of projects and/or exercises.
3. Transfer of credit from courses taken at other colleges and universities, and from courses conducted by the Armed Forces. Transfer of such credit would be allowed when the courses taken elsewhere were comparable to those of the School as determined by comparability of educational objectives. Before full credit transfer was authorized, the elsewhere-taken course would be reviewed to determine if full or partial credit should be allowed.

4. Critical inspection and evaluation of work experiences for the last five years. Eligible professional activities might include the establishment of an industrial hazards monitoring system, the preparation of a research report or professional paper, the presentation of instructional material at a workshop, and so on. Students seeking credit for prior learning experiences would be required to submit portfolios of their previous work to a faculty assessment committee. The committee would be composed of School faculty, supplemented as appropriate by outside consultants. It would be charged with the responsibility of reviewing the portfolio, interviewing the student if necessary, and recommending what credit should be granted.

End-of-course examinations would be conducted in writing or orally as deemed appropriate. Written examinations might be administered regionally or locally by cooperating colleges and universities, or by libraries. In addition, the College Entrance Examination Board, or the Educational Testing Service with their many testing locations, might be contracted with to administer PGSOH examinations.

Certification (Degree) Requirements

1. A diploma in occupational health would be awarded following the successful completion of a program of study for which 30 credits had been awarded. As described previously, credit could be obtained in various ways. A possible formula for allocating maximum amounts of credit which could be awarded on the basis of various procedures might be:

a. by taking PGSOH courses and passing examinations over them . . . . . up to 100%

b. by taking PGSOH examinations without taking coursework . . . . . up to 95%

c. by transfer of credit without taking examinations . . . . . up to 50%

d. by credit for assigned projects/field work while enrolled in School . . . . . up to 25%

e. by award of credit for past work/ professional experiences & products . . . . . up to 25%

2. Credits would have to be accumulated within a four-year period.

3. A student would be required to attend the orientation session for each course of instruction and to attend one group discussion session for each course taken. Persons taking final exams without coursework would first be required to provide evidence to their counselor that they were ready for the exam.

4. A student would be required to pass an examination covering each of the five core courses. In effect this means that each student would be required to accumulate 15 credits by passing examinations over School-developed course work.

Relicensure

Every effort would be made to obtain accreditation for all School courses. To accomplish this the American Board of Preventive Medicine and professional societies and other accrediting bodies would be asked to review courses developed by the School, to accredit these courses, and to recommend the amount of credit that could be awarded towards the Physician's Recognition Award for the successful completion of the course.

Techniques for Ensuring That Courses are Job Relevant

Curriculum developers often must face the problem of judging whether or not a job-relevant course also will be perceived as academically relevant by those responsible for accrediting the course. It seems probable that the academicians in public health and community medicine would claim that core courses in epidemiology, toxicology and so on (with the possible exception of the administration of occupational health programs) are all academic subjects which should not be heavily influenced by local job requirements. The usual approach followed by academicians is to present "educational" programs which cover the basic skills and knowledges for a subject matter area. Such courses often are perceived as irrelevant by field practitioners. On the other hand, academically oriented accreditation groups are skeptical of curricula which are too job oriented. Faced with this dilemma, a course developer must ensure that both sets of requirements are met. He should be aware of the latest rules and regulations being promulgated by federal and state regulatory agencies. He should keep up with the latest programs in occupational health and with the most recent research developments. In addition, he should use student feedback to assess the relevancy and usefulness of his courses.

Course developers employed by the School, a medical school, or a school of public health face the same problem with respect to relevance. Once the profession as a whole defines what relevancy means the course developer can go about ensuring that his course fits those definitions. As currently conceived, School course developers will remain current by providing consulting services to industry. Secondly, through the selection of plant physicians and corporate medical directors to serve on course review committees, the course developer will be able to obtain information about changes in field requirements. Thirdly, by reading

the JOM and other professional journals the course developer can keep abreast of new research and development findings. Fourthly, by keeping up with new developments in applicable government agencies the developer can maintain his currency with respect to the legal requirements that may impact on occupational medicine.

To repeat, the problem is not one of how to maintain job relevant courses, rather it is one of defining the basis upon which job relevancy will be determined. Will courses be based on known job requirements? Will they be based on an attempt to provide occupational health practitioners with underlying skills and knowledges? Or, will a compromise be attempted? Courses developed by the School will present basic skills and knowledges related to subjects such as toxicology. Then, through the selection of job-relevant problems, they will teach the application of the basic knowledges that comprise the academic subject matter.

Techniques for Updating Course Content

In the action plan time has been provided for course administrators to update those courses assigned to them. In addition, it has been assumed that School professors would keep current in their field by providing consulting services to industry. In addition to these procedures, course review committees that were originally established to help in the initial development of the courses might be retained for course reviewal purposes. These course review committees could submit suggestions on an annual basis regarding the new topics which should be included in the core and elective courses. In addition, they could contribute to the identification of new courses which should be developed.

Procedures for Assuring School Credibility

The School will survive as an educational institution to the extent that it provides a quality education service to its potential student body. In the early years of the School students are likely to come from the ranks of practitioners in occupational medicine, or from mid-career physicians who might wish to enter this specialty. Students who otherwise might wish to attend the School might not enroll for financial reasons. Industry must be willing to provide tuition monies. Just as important, there must be a reason why industrial and other organizations should pay the tuition for persons they send to the School. Industry must feel that it is to their advantage to send to the School their plant physicians, medical directors, industrial nurses, and so on. Furthermore, industry and occupational health practitioners must feel that the School belongs to the profession of occupational medicine; that it serves the needs of the profession as opposed to a subgroup within the profession, a single company, a single university, or a single industry no matter how large that industry currently may be.

At best medical education is very expensive and the cost of this education must be spread over as large a group of students as possible. If a single industry, such as the chemical industry, wishes to establish its own educational institute it will be free to do so as long as it is willing to pay in one way or another for the upkeep of the School. As conceived of in the action plan, the five core courses of instruction would be rather general and would be applicable throughout industry. Each of the core courses could be tailored somewhat to meet the needs of industries through the selection of elective instructional modules which could comprise a portion of the core course. In addition, depending on student demand, elective one and two credit courses could be developed to serve the needs of a specific industry.

It would seem that in order to provide a service to a potentially large student body, and to be of service industry-wide, the School must attempt to find a middleground between a number of vested interest groups. Certainly the School should be oriented to the needs of industry. In addition, existing medical schools and schools of public health should be involved in a collaborative manner. The current action plan does not consider this course of action in detail because of the problems associated with coordinating the activities of persons employed by a number of different universities. However, there are acceptable procedures for securing the cooperation of present medical institutions. For example, certain of the School courses could be developed and periodically updated under contract to a particular school of public health. Also, medical schools and schools of public health throughout the country could be asked to help administer School-developed courses.

As presently conceived, most School professors would administer courses on a half-time basis and spend the remainder of their time providing consulting services to industry, labor and government. Instead of providing consulting services, certain professors could undertake R&D work under contract to government. Obviously these activities would compete to a certain extent with those now carried on at medical schools and by consulting organizations. A certain amount of such competition is inevitable. However, the market for these services is expanding so rapidly that new consulting capabilities need to be developed.

It is worth mentioning the efforts that have been made by a number of non-traditional universities and consortiums to lessen the competition between themselves and existing colleges and universities. For example, the American College of Life Underwriters develops its own course material but for the most part this

course material is administered by cooperating colleges and universities throughout the country. The American College is primarily supported by examination fees. Its courses are administered by colleges and universities; students pay a fee to the local institution for attending these courses. In this way the American College does not compete with other educational institutions and in fact helps increase enrollment at these institutions.

The New York State Regent's External Degree Program administers tests and awards credits but does not develop course material or administer courses. The Thomas A. Edison State College of New Jersey is concerned with helping students plan their educational program consolidating and validating credits obtained elsewhere. The University Without Walls and the Nova University are both degree-awarding organizations which offer largely self-instructional courses as well as credit for courses taken at other institutions.

Competition for students is most apt to occur within a single university. For example, institutions such as Syracuse University and the University of Pittsburgh have developed non-tradiational programs which allow students to obtain degrees in selected subjects almost entirely on the basis of self-instructional activities. In one sense these non-tradiational programs compete with the traditional programs offered at these same universities. In another sense, they are non-competing in that the non-traditional programs are for persons who for one reason or another cannot or do not wish to meet university residency requirements.

PGSOH ORGANIZATIONAL STRUCTURE AND BOARD OF DIRECTORS

Organizational Structure

The School would be organized like a single department college. Moreover, to decrease overhead costs, key School personnel would be required to supervise one or more administrative offices or sections and this situation might always previal.

In addition to the Executive Office there would be three Directorates -- the Educational Directorate, the Business and Finance Directorate and the Educational Technology and Support Directorate. A suggested organizational chart for the entire School and for each Directorate is contained in Figure 1.

The Executive Office, headed up by the President of the School, would coordinate all institutional activities, handle public relations activities, and would be responsible for marketing -- contacting potential students, and promoting and coordinating the consulting services to be provided by the School.

The Business and Finance Directorate, headed by the Director of Business and Finance, would supervise the Business Office, the Billing, Purchasing and Accounting Office, the Personnel Office and Building Services.

The Educational Technology and Support Directorate, headed by a Director, would have general supervision over a Learning Center, a materials production department and the Instructional Development Department.

The Learning Center would maintain a collection of print and non-print instructional materials, possibly provide student loan services, order materials sought by persons in the Educational Directorate, and so on.

The Instructional Development Department would be a shell organization initially staffed by persons who would develop one of the School's five core courses.

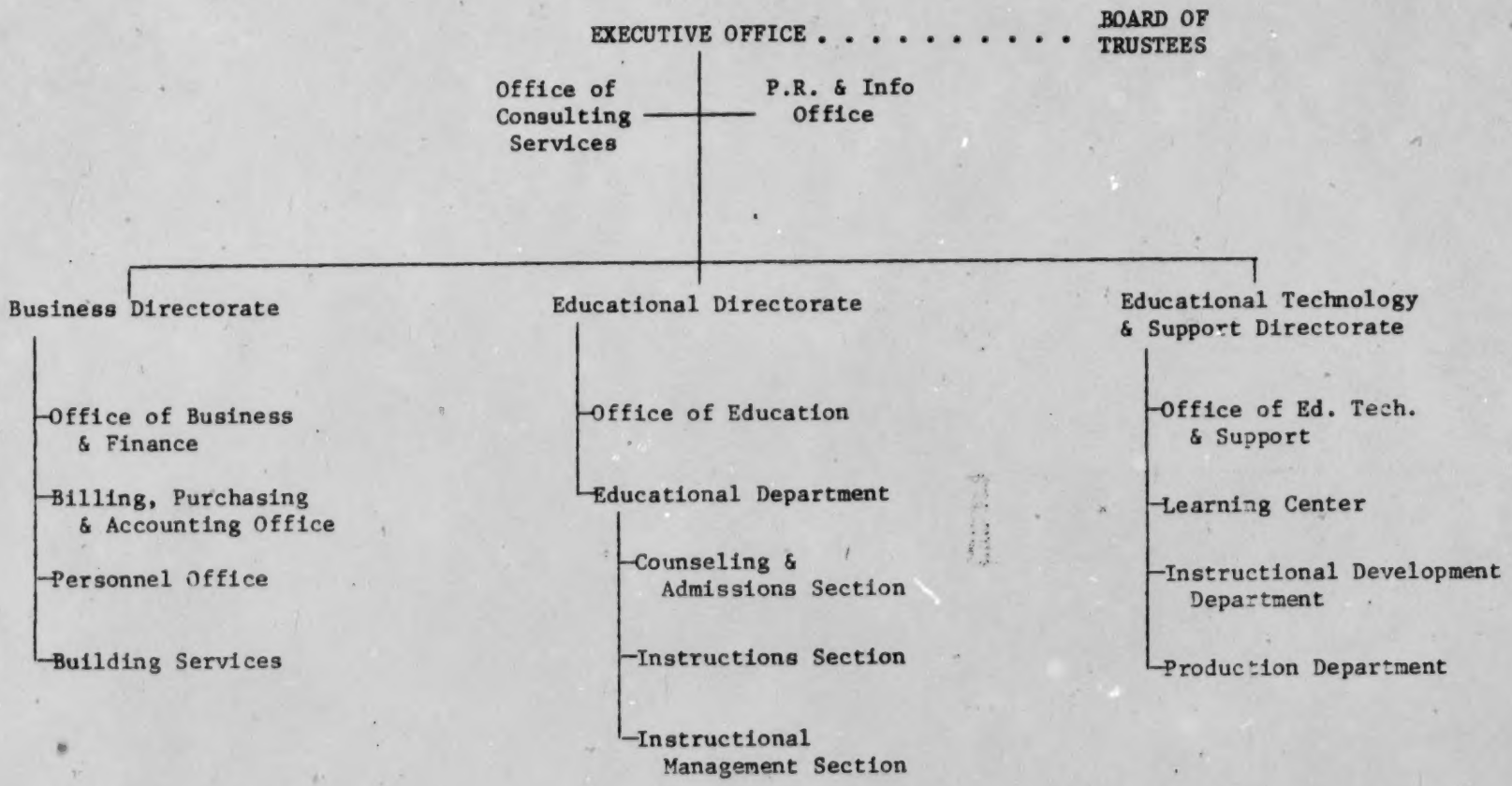

Figure 1. Organizational Chart for Post-Graduate School of Occupational Health

Later on this department would be staffed by persons in the process of developing elective courses. After a course developer had prepared most of the material for a course he would transfer to the Educational Department of the Educational Directorate. Supervision of course development activities would be provided by the Director of the Educational Technology and Support Directorate. The Director would be expected to train course developers regarding how to develop self-instructional course material, self-assessment material, various types of exercise material, and provide assistance regarding the evaluation of course material.

Initially course developers would be hired with the understanding that eventually they would assume the duties of a Student Counselor and course instructor. This means that these persons probably would not have the time to develop elective courses. Such courses might be developed by any of the following procedures:

a. One or two of the original course developers might decide that they would rather develop new courses than to teach and maintain existing courses, and to function as student counselors. If that were agreeable to the School, these persons would be assigned to develop new courses, and a person would be hired to present and maintain the core course they developed and to serve as a student counselor.

b. New course developers could be hired by the School for the specific purpose of developing a course, presenting it thereafter, and functioning as a student counselor.

c. Using grant monies, adjunct personnel could be hired for the purpose of developing a particular course of instruction which then would be administered and maintained by Institute personnel.

d. Additional courses could be developed under contract to an individual or to an institution.

The Production Department would be responsible for producing instructional material and for maintaining a storehouse of course material. Since most instructional material would be in the form of printed, modularized packages, the Production Department would be staffed with editors, typists, pressmen and persons capable of preparing audio-visual media on demand. As the supply of modules for a particular course dwindled towards a replacement order point, the Production Department would coordinate plans for the production of additional material.

The Educational Directorate, headed by either the School's President or a Dean of Education, would consist of an Office of Education and a single department subdivided into three sections. By organizing this Directorate as a single department we would hope to ensure that all School courses articulated with each other without unnecessary overlap.

The Counseling and Admissions Section would function as the School's registrar and would be staffed by School Instructors. Each potential student would be assigned to a counselor/instructor who, in collaboration with the future student, would identify the student's educational requirements and would decide whether or not these requirements could be met by enrollment in the School. Assuming that they could be, the student would be enrolled and then he and his counselor would plan a program of study. These plans would be incorporated into a Learning Contract.

Each full-time counselor would be responsible for the progress of about fifty students. In addition, each counselor would be responsible for all or portions of two or three courses -- to conduct orientation and review sessions, to oversee testing sessions, and to upgrade and revise course material from time to time. The major duties of a Counselor/Instructor are shown in Tables IX and X (see Appendix B) along with an estimate of the number of hours per year that might be devoted to the execution of each duty.

A Counselor/Instructor would be responsible for providing student counseling during course work, for grading examinations, for determining when a learning contract had been broken, and for recommending actions to be taken in response to a broken contract.

The development of a course of instruction based on syllabi and self-instructional material is an expensive undertaking and seldom is justified unless the anticipated demand for the course is rather high. Therefore, other means would have to be found to provide students the opportunity to undertake special courses of instruction. It would be the task of a Counselor/Instructor to determine how best to satisfy the education requirements of a student. As illustrations, a student might be directed to other institutions which offered a course of instruction similar to that which he desired to undertake. As a second option, a student and his counselor might devise a special series of readings and other educational experiences which collectively would comprise a course of instruction. The Counselor and student would agree on how the student would demonstrate course mastery. As a third alternative, the counselor might recommend tutors and/or help the student enroll in other institutions. In this roll the counselor could function as both a counselor and advocate and would ensure that the student participated in educational experiences for which credit could be awarded.

The Instructions Section would have the overall responsibility for the administration of course work. This section would be staffed by Counselor/Instructors. They would administer Learning Contracts by forwarding instructional material to students, grading end-of-module examiantions, scheduling seminars and review/testing sessions at regional locations, and so on.

The Instructional Management Section would be responsible for maintaining academic records. This section would maintain a record of student progress and

accomplishments, would alert counselors when a learning contract had been broken, would prepare a final transcript for each student, and so on.

Persons would be added to the School's staff as the need for them developed. Appendix C contains a table which shows the projected hiring schedule for the School, the numbers of persons attached to each organizational element, and their projected salaries.

Governance

A Board of Trustees should be established for the School, and should be composed of persons who represent the various agencies, organizations and professional groups that have an interest in occupational health. It should include representatives from the professional societies, several representatives from industry and labor unions, representatives from the civilian educational arena who are familiar with traditional and non-traditional educational programs, and representatives from appropriate government agencies.

The composition of the Board should reflect OHI opinions on two subjects -- the degree to which the School should have a broad-based support, and secondly the degree to which the board should reflect professional interests. The authors of this report believe that the heaviest representation should be from the occupational medicine profession.

The role of the Board of Trustees would be to establish School policy, especially with respect to such topics as the fee structure, charges for consulting services, the extent to which consulting services should be emphasized, the relationship between the School and the AOMA, OHI, ACPM, and other professional groups. Also, the Board might consider recommendations for new courses of instruction, and new services to be offered by the School. Hopefully, all members of the Board

should be selected early in the life of the School. Then, by random drawing, staggered terms of the members could be established. The terms should be for two, three, or four years in length.

Recruitment of Professors/Course Developers

In addition to three key administrative positions, it would be necessary to recruit fourteen professors. Their principal responsibilities would be threefold: to develop course material, to function as instructors, and to serve as consultants. The work activities of these persons are outlined in Table VI, Appendix B.

The fourteen school professors would be recruited from existing schools of public health and of preventive medicine, from industry, and from government agencies. Their initial salary of $35,000 per annum would be comparable to that of a full professor in a school of public health. In addition, they would receive a liberal amount of leave (36 days) and have an opportunity to get in on the ground floor of an exciting new and rewarding educational venture. In our judgment, it will be possible to recruit such persons.

School professors would have to meet two sets of criteria, one dealing with subject expertise and a second set relating to a willingness to develop self-instructional material.

A potential professor would have to be a recognized expert in a content area of interest to the school. The candidate should be familiar with the application of a content area to industrial settings, should be interested in keeping abreast of new developments and applications in his area of expertise, and should be willing to provide consulting services to industry. The candidate should have two years or more of experience as an instructor. Secondly, as judged by search and review committees, the candidate should be an expert in the subject area(s) for which he would be required to develop courses of instruction.

The candidate professor must evidence a willingness to develop self-instructional material, to administer courses of instruction and to act as a student counselor. In addition, the candidate must be willing to: (a) attend a training program for course developers; (b) work with curriculum review committees; (c) develop applied problems for examinations; (d) develop a detailed course syllabus; (e) prepare detailed lists of training objectives; (f) and develop instructional modules in accordance with a general format prescribed by the School.

Proposed School Location

It is recommended that the Post-Graduate School of Occupational Health (PGSOH) be located in lower Montgomery County, Maryland. A second alternative would be to locate in Northern Virginia. A third alternative would be to select a state that makes the least demands on organizational and financial requirements.

The PGSOH would be designed to serve a nation-wide clientele. It would function primarily as a out reach school but would conduct seminars and examinations at selected locations throughout the country. At some future time a number of collaborating medical institutions might administer courses developed by the PGSOH. The headquarters of the School, therefore, could be located at any one of many sites; the one selected should meet a number of practical criteria.

First and foremost, the School should be located near a good source of literature related to occupational health. Locating near a medical school would satisfy this criteria; locating near the National Library of Medicine would be even more advantageous. However, the School cannot rely solely on the library facilities of the NLM and nearby medical schools. It must develop its own collections of pertenent documents and journals.

The School should be located in a region where a large number of its potential students now work. Also, it should be located in an area of the country that contains a number of persons who might serve on the School's curriculum development committees.

If the PGSOH were to affiliate with an existing medical school then it might be advantageous to locate near that school. Such an affiliation is not contemplated at this time.

Finally, a number of the key persons who might comprise the initial staff of the School reside in the D.C. area and thus it should be easier to recruit such persons.

Incorporation as a Non-Profit Institute

It is recommended that the Post-Graduate School of Occupational Health be incorporated as a non-profit educational institution within the State of Maryland.

Up until June 30, 1976, the incorporation of post-secondary educational institutes within the State of Maryland need to be approved by the State Board of Education. Approval of a medical institute hinged on the receipt of favorable recommendations by state medical societies. A small incorporation fee was required. In addition, approval of a non-profit organization had to be obtained from the State Department of Taxes and Assessment.

In accordance with a newly passed law, as of 1 July 1976 a new set of state requirements must be met in order to incorporate within Maryland as a post-secondary institute of education. These requirements will be developed by the Commission of Higher Education of the State Board of Education. The new guidelines for incorporation have not yet been established. It is expected that they will not differ significantly from those followed in recent years, yet as of the writing of this report no one is certain as to the new requirements. In July we should be able to obtain more definitive information regarding incorporation requirements.

If need be, incorporation criteria can be circumvented by affiliating with an already incorporated post-secondary institute of education.

PHASES OF INSTITUTIONAL DEVELOPMENT

Development of the School would proceed through five phases ending with a Fully-Operational Phase which would begin five years after the initial funding of the School. The first four phases would overlap considerably. Tables II and III depict the estimated status and capability of the School during its first six years of operation.

Organizational Development Phase: During this phase the School's key personnel would be hired and personnel for important subordinate positions would be obtained. The President, the Business Manager, the Director of Educational Technology, and their key subordinates would establish the organizational units within their directorates, would develop the procedural details to be followed by these units and would staff them at least partially. The necessary equipment and supplies for first year operation would be obtained. As early as feasible a committee would undertake the selection of a permanent site for institutional headquarters. The organizational development phase would be completed within a twelve month period.

Core Course Development Phase: This phase would commence no later than four months after initial funding of the School. By that time key course developers should have been hired or at least identified, one developer for each of the five core courses to be presented by the Institute. Each developer would be asked to prepare approximately 180 hours of instructional material and organize this material into modules. The initial step in this process would be the development of a course syllabus. Mid-way through the second year of the Institute each course developer should have developed at least 135 hours of material, enough so that presentation of a three-credit course could commence. The remaining 60 hours of material could be developed during the second half of the second year of the School.

Table II PHASES OF COURSE DEVELOPMENT DURING FIRST SIX YEARS OF OPERATION

Phases of Development	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year
	Develop Five 3-Credit Core Courses	Complete Core Course Development (1st half)	Update Courses	Update Courses	Update Courses	Update Courses
		Develop 10-Credits of Elective Course Material	Develop 18-Credits of Elective Course Material	Develop 4-Credits of Elective Course Material	Update Elective Courses	Update Courses
		Begin to Administer Core Courses (2nd half)	Begin to Administer Elective Courses	Administer Courses	Administer Courses	Administer Courses

Table III SUMMARY OF SCHOOL CAPABILITIES AND ANTICIPATED STUDENT LOAD

	1st Year		2nd Year		3rd Year		4th Year		5th Year		6th Year	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
Credits-Worth of Course Material	--	--	--	15	25	30	43	47	-- 47 --		-- 47 --	
Student Handling Capacity	--	--	--	125	-- 250--		-- 350--		-- 350--		-- 350--	
Credit-Hour Capacity	--	--	--	469	--1875--		--2625--		--2625--		--2625--	
Anticipated Student Load	--	--	--	60	-- 155--		-- 200--		-- 270--		-- 335--	
Anticipated Credit-Hour Load	--	--	--	225	--1162--		--1500--		--2025--		--2512--	
Number of Consulting Days Available	40	60	75	213	-- 559--		--1100--		--1458--		--1498--	

Elective Course Development Phase: At the beginning of the second year of the School additional course developers would be hired to begin the development of elective courses. Assuming that a demand for such courses existed, ten credit hours worth of elective course material would be developed during the second, third and fourth years of the School. By the beginning of the fifth School year a total of 47 credits worth of instructional material would be available

Operational Start-Up Phase: During the seventh month of its second year the School would begin to present courses of instruction. During the next twelve months each course developer would be mastering new duties -- they would be functioning as Student Counselors, would be conducting orientation and review sessions for the course they developed, and would be undertaking a formative evaluation of their course materials and procedures. As required, they would complete development of the instructional material for their core course.

The roles of course developer, student counselor and course administrator/evaluator are quite different and perhaps should not be undertaken by the same person. Therefore, course developers would have the option of splitting their activities between three roles -- course developer, course administrator/student counselor and consultant to government and industry. Tables VIII and IX show the options that would be available to course developers, counselors and consultants (see Appendix B).

Fully Operational Phase: This phase would be reached at the end of the fourth year of the School. At that time all five core courses should be operating smoothly, 32 credit-hours of elective course work would be operational and the School would be able to supply large amounts of consulting services to industry.

The discussion contained in this section is based on a number of assumptions about course characteristics, course development time and estimates of course developer/professor workloads. These assumptions, along with tables showing workload estimates, are presented in Appendix C.

EXPENDITURE AND REVENUE PROJECTIONS

Expenditure Projections

Table IV contains a summary of the expenditure projections for the School's first six years of operation. The expenditure-revenue ratio should stabilize after about the fifth year of operation. To arrive at the projections shown in Table IV certain assumptions had to be made. The major ones were as follows:

a. That course developers, instructors and consultants would all be holders of a medical degree and would have had some experience in the field of occupational medicine;

b. That course developers/instructors, the persons hired to develop the core courses, would be paid a base salary of thirty-five thousand dollars during their first year of employment. In subsequent years the base and ceiling salaries would be raised by approximately five percent per year;

c. That the president of the School and the Directors of the Business and Finance Directorate and the Educational Technology and Support Directorate would receive salaries of forty thousand and thirty-five thousand dollars respectively for their first year of employment. They would receive yearly raises of approximately five percent;

d. That all consulting fees earned by School employees would revert to the School;

e. That all non-professional School personnel would receive annual salary increments at the approximate rate of seven percent;

f. That staff benefits would be twenty percent of one's earned salary per year;

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g. That overhead costs would be approximately fifteen percent of all School direct costs;

h. That a certain amount of funds would be required each year to provide an honorarium for and to pay per diem costs for non-School personnel serving on course development committees.

As shown in Table IV, projected costs for the first year of operation are $607,096. These costs rise to $1,554,363 for the sixth year of operation.

Most projected costs are associated with personnel. During its sixth year of operation the Institute would employ an estimated 37 persons, 14 of whom would be highly paid course developers, counselors or consultants.

Backup information relating to anticipated expenditures is contained in Appendix C.

Revenue Projections

Table V summarizes the projected revenues for the School during its first six years of operation. Revenue would be generated from two sources -- from student fees and from consulting fees. In addition, the course development phases of the School would require considerable funding from outside sources, probably from a foundation grant plus a subsidy from industry. According to current calculations the School would be completely self-supporting by the end of its sixth year of operation. The projections contained in Table V are based on the following assumptions:

a. That student enrollment would increase from 60 students during the second year to about 335 students during the sixth year (see Table III);

Table IV PROJECTED EXPENDITURES DURING FIRST SIX YEARS OF OPERATION

	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year
Staff Salaries	$363,800	$665,600	$894,100	$966,900	$1,023,000	$1,065,600
Staff Benefits (20% of Salaries)	72,760	133,120	178,820	193,380	204,740	213,120
Σ Personnel Costs	446,560	798,720	1,072,920	1,160,280	1,228,440	1,278,720
Materials & Services	46,350	47,800	45,800	52,100	54,300	57,900
Course Development Committee	35,000	52.500	54,300	43,750	23,750	15,000
Σ Direct Costs	527,910	899,020	1,117,020	1,256,130	1,306,490	1,351,620
Overhead (15% of All Costs)	79,186	134,853	175,953	188,420	195,974	202,743
Σ Projected Expenditures	607,096	1,033,873	1,292,973	1,444,550	1,502,464	1,554,363

b. That the average fee for credit hour per credit hour would increase from $300/credit during the second year to $410/credit during the sixth year of operation (see Table V);

c. That the average student would take seven and one-half credits-worth of course work per year, and, would take up to four years to acquire the thirty credits required to receive a diploma from the School;

d. That the average daily consulting fee for School personnel would increase from $350 during the first year to $400 during the sixth year (see Table V);

e. That the number of consulting days per year would increase from 100 days during the first year to 1498 days during the sixth year (see Table III).

Additional information relating to revenue projections is contained in Appendix C.

Table V PROJECTED REVENUES, INCOME FROM OTHER SOURCES AND ANTICIPATED SURPLUSES DURING THE FIRST SIX YEARS OF OPERATION·

	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year
Student Fees						
Ave. Charge/Credit Hr.	--	$300	$325	$350	$375	$410
Estimated Revenue (7½ Credits per Student/Year)	--	67,500	377,812	525,000	759,375	1,030,125
Consulting Fees						
Ave. Charge/Consulting Day	$350	$350	$375	$375	$400	$400
Estimated Revenue	35,000	100,800	209,625	412,500	583,200	524,300
Σ Estimated Revenues	35,000	168,300	587,437	937,500	1,342,575	1,554,425
Σ Estimated Expenditures	607,096	1,038,873	1,292,973	1,444,550	1,502,464	1,554,363
Σ Estimated Deficit	572,096	865,573	705,536	507,050	159,889	--
Additional Source of Funds						
Foundation Grant	400,000	600,000	400,000	200,000	--	--
Industrial Subsidy	200,000	250,000	300,000	300,000	200,000	--
Σ Income From all Sources	635,000	1,018,300	1,287,437	1,437,500	1,542,575	1,532,313
Anticipated Surplus/year	27,904	(15,513)	(5,536)	(7,050)	40,111	62

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THE DEVELOPMENT OF AN ACTION PLAN FOR A POST-GRADUATE SCHOOL OF OCCUPATIONAL HEALTH

SOME BACKGROUND CONSIDERATIONS

"Half of what I teach you is correct and the other half will in a few years be proven incorrect. The only trouble is, I can't distinguish the one half from the other"[1]

Continuing Medical Education (CME): A Concept Whose Time Has Come

Obtaining a medical education is an arduous task indeed. After four years of a somewhat leisurely pre-medical education, one plunges into four years of a highly demanding and exhausting undergraduate medical program. Upon receiving their degree many new medical graduates look forward to establishing a practice, only to discover that they are just half way there. Brought back to reality, they enter and complete their internship program. Many go on from there to extensive residency programs in order to quality for a specialty. Somewhere along the way they must take and pass their specialty Board examinations.

Having successfully overcome these many educational hurdles, and assuming that they are not in a state of physical, mental or financial exhaustion, the now fully-trained physician can look forward to a lifetime of professional practice. Occasionally he may remember that one of his former mentors suggested that anyone entering the medical profession was expected to make a firm commitment to a lifetime of education and re-education. In general this commitment to lifelong learning has been one of lipservice until recent years. Following World War II, the state-of-the-art in medicine has advanced at an ever increasing rate until now it

[1] Rosato, Francis E., M.D., Self-Assessment of Continuing Medical Education, Surgery, Vol. 71, No. 4, April 1972, pp. 642-644.

is claimed that the half-life of medical knowledge is about eight to ten years. To prevent early obsolence, continuing education is now an obvious requirement for practicing physicians.

It is disquieting to suspect that physicians who have been practicing for ten years or more may not be able to provide the best and most current medical service to their patients. This suspicion has led in recent years to considerable efforts by the medical profession and by federal and state governments to foster the establishment of various systems for providing continuing medical education. Continuing medical education is rapidly becoming a requirement for relicensure and may be a requirement for continued acceptance as a member in good standing of one's profession. Continuing medical education is here to stay and is becoming a requirement for most, if not all, other professions. The problems now are how to develop a suitable system for deliverying continuing medical education, and secondly, of identifying the incentives and disincentives which must be built into the system in order to ensure that all practitioners will continue their education throughout their professional careers.

Few medical students progress through medical school having clearly identified the specialty for which they wish to be prepared. Sometime during one's lifetime most of us wish we were competent in another subspecialty of our profession or even in an entirely different profession. This seems especially true of a rather sizable number of persons who eventually become full or part-time practitioners in occupational medicine. Many large industrial corporations have widely scattered small plants which are too small to employ the services of a full-time plant physician. Usually, a local medical doctor will be asked to serve part-time in this capacity. This physician may know someting about preventive medicine, may have been exposed to epidemiology, and hopefully will have taken a survey course

covering such topics as environmental health and toxicology. In most instances, however, new part-time plant physicians must enter into this field with a considerable lack of knowledge and skill regarding occupational health. Such persons have a somewhat different continuing medical education requirement. Instead of needing a means for upgrading their skills and knowledges they need a system which will allow them to acquire a new set of capabilities while maintaining their current practice.

Quite possibly there are some knowledges, and especially skills, that can best be acquired under formal, controlled educational settings such as those provided by a medical institution. However, lacking a consensus on this point, the medical profession must push onward to develop improved continuing education procedures, procedures that do not require one to return to a formal educational setting for long periods of time.

The Educational Requirements of Adult Learners

When thinking about continuing medical education one should keep in mind the characteristics of the target audience and their particular educational requirements. Continuing medical education is for adults who already have established themselves in their profession. For a variety of reasons their practice or their current job does not allow them to become full-time students at a distant location. Their continuing education must be fitted into their current professional activities. To a considerable extent their continuing education must be free of time and space restrictions. Preferably, the delivery system for this education will possess a high degree of self-instructional materials.

The above requirements for professional adults pertain also to those adults who, for one reason or another, wish to obtain an undergraduate or

graduate degree in any profession. Since 1936 in England, various systems have been developed which allow an adult student to obtain a BA or BS degree without meeting strict time and residency requirements. Perhaps you may recall that up until the 20th century education primarily was carried on as an individual, self-study activity. This is still the case in Europe. After enrolling in a European educational institution a student and his mentor block out a program of instruction and the student is informed as to how his educational achievements will be assessed. Within certain time limits, it is the student's responsibility to pursue individually a program of instruction and then to present himself for examination.

Our current post-secondary educational system in the United States, requiring three or four years of undergraduate residency to receive an BA or BS degree, is a 20th century phenomenon. It already is being closely questioned in many educational circles. More and more educators are coming around to the view that regardless of residency requirements and exposure to learned professors, the only thing that really counts is demonstrated competency however that competency might be acquired. Over a century and a half this view has led to the development of a wide variety of what have become known as non-traditional programs. In one way or another these non-traditional programs attempt to meet the educational needs of adults who cannot meet the residency and time requirements of the typical college and university. Among the existing non-traditional programs now underway are: the New York State Regent's External Degree Program, the University Without Walls Program, the Florida Nova University Program, and Empire State College.

The proposed Post-Graduate School of Occupational Medicine currently under review here would be a logical extension of past and present educational trends as applied to the current educational requirements of

occupational health practitioners. The School would be a product of the increased emphasis now being given to the concept that medical practitioners must engage in a lifetime of educational activities. The School would employ techniques especially developed for adult learners, techniques which are now successfully employed by a number of non-traditional educational programs. The School's educational program would be especially suited to the mid-career physician who must for the first time acquire competency in the field of occupational health.

The Educational Requirements of Mid-Career Professionals

The mid-career educational problems of professional persons stem from two sources -- their difficulty or reluctance to take large amounts of time off from their professional work, and, the difficulty of providing suitable motivation so that the practitioner will make every effort to integrate his continuing education activities with his daily professional activities.

A second set of problems faced especially by the medical practitioner concerns the direction of his continuing education efforts. Should these efforts be directed towards meeting current or anticipated job requirements, or, should they be directed towards achieving increased professional status by the passing of specialty Board exams? These two goals may not necessarily be reached by following the same educational route. Indeed, it is almost a foregone conclusion that to become Board certified one must become knowledgeable regarding a wider range of topics than if one is to become highly knowledgeable regarding the tasks surrounding a particular job position.

The pursuit of educational goals in mid-career must in some way be related to rewards one expects to attain if the educational goals are reached. In some instances the opportunity to practice in a medical specialty depends upon becoming Board certified. This may provide some persons with a suitable incentive to pursue a program of continuing education. On the other hand the penalties, if any, for not becoming Board certified in occupational health are not immediately obvious. Incentives related to continuing education for industrial health physicians must be related to relicensing requirements, or, to an interest in acquiring new abilities, especially as these relate to the various job aspects of a plant physician or corporate medical director. Many aspects of such jobs are not now covered adequately in undergraduate medical programs nor in post-graduate internship programs.

To a certain extent all professionally educated persons have learned to take some responsibility for their education. However, few of us are skilled at planning out an educational program and fewer still are skilled at identifying our own knowledge and skill deficiencies. Therefore, those who wish to undertake a program in continuing education would benefit by receiving planning assistance. They would benefit by receiving help in identifying their strengths and deficiencies and the various educational courses available to correct their deficiencies. They might like to receive assistance in enrolling in various programs and might benefit from receiving help in evaluating the various alternatives they have for attaining their educational goals.

A person who is continuing his education wants assurances that the educational courses and activities he engages in are accredited. If he decides to attend a workshop or institute, or wishes to study with another individual for a period of time, he would like assurances that these educational experiences will meet acceptable standards of quality. Therefore any institute which specialized in continuing education must see to it that its own programs are accredited, and must also assure that all other institutions and educational experiences which it might recommend to its students also are accredited. In some instances the School might have to assume the role of an accrediting agency, assuring, for example, that certain individuals who provide tutorial instruction do indeed provide high quality instruction.

For a variety of reasons a person might wish to accumulate educational credits, particularly for the purpose of relicensing. In addition, for all educational programs means must be found to certify that persons who have gone through the programs have acquired desirable knowledges and/or skills. There is, therefore, a need for organizations that will examine an educational program and decide its worth in terms of numbers of educational credits. These same or other organizations may then award a degree of diploma on the basis of credits obtained from a variety of accredited institutions.

A variety of procedures have been established for examining people to determine if, in lieu of participating in an educational program, they should receive credit by examination. It makes little sense for an adult to be required to study course material if he has already achieved mastery of that material. Rather, he should be allowed to demonstrate his mastery

by taking appropriate examinations. Credit should be awarded for successfully passing the examinations.

Obviously, continuing medical education programs must be based on the availability of suitable instructional material. To some extent this material is available if one wishes to return to the formal setting of a medical school or teaching hospital. Many practitioners, however, do not believe that this is a viable alternative for them. Moreover, where does one go to receive residency training in occupational health? Only five such programs exist. Therefore, to satisfy the needs of continuing education in occupational medicine new programs and new educational delivery systems will have to be developed.

Some Recent Trends in Continuing Medical Education

Each year a number of one- and two-day workshops are held at national and regional professional meetings. In addition, one- and two-week workshops and institutes may be conducted by one or a consortium of medical institutions. Such workshops and short institutes currently are the most common means for providing continuing medical education. If this trend continues there should be more opportunities for the busy practitioner to participate in formal continuing educational activities.

An increasing number of medical schools are presenting courses at local hospitals. For example, Stanford University, after revising their core courses in the biological sciences and in clinical medicine, have begun to present these courses on a weekly basis at hospitals in San Mateo, California. This allows community physicians practicing at those

hospitals to learn about the most recent advances in biological science and in clinical medicine. One of the major advantages to such a program is that it is brought to the work site of the physician.

A number of medical educators have pointed out that continuing education programs often are not appropriate to the individual practitioner. They teach him knowledges and skills which cannot be used in his own practice. The busy practitioner might well wonder why he should participate in a CME program that does not serve the best needs of himself and his patients. To correct this situation an interesting set of procedures has been developed at the University of Wisconsin. The general approach is based on the development of an Individual Physician's Profile. Employing this approach, the physician makes a record of the types of patients he sees and the types of problems he encounters. Physicians at the University then develop a profile of the physician's practice and then develop a medical examination which will thoroughly assess the physician's medical knowledges and skills, concentrating on those that pertain to his practice. After identifying the physician's strengths and weaknesses an individualized program of instruction is outlined to correct any identified deficiencies. The advantage of this approach is that it leads to a CME program which has obvious relevance to the practicing physician. Therefore, the physician should be highly motivated to complete the educational program. The major disadvantage to the approach is that it might be difficult to implement nation-wide; the manpower requirements would be too high.

Finally, we must take note of one of the foremost CME developments in recent years. We refer to the self-assessment programs which first were developed and promulgated by the American College of Physicians,

beginning in 1968. Each year thousands of physicians have participated in this self-assessment program and the program has been copied now by other medical specialty groups. The virtues of these self-assessment programs are widely known. They are self-administered and can be self-scored. They protect the privacy of the individual physician in that only he or she knows their deficiencies as identified by the examinations. They usually provide a central scoring facility and from this service normative standards can be developed. These standards can be employed by a physician to compare their examination performance with those of their peers. Also, the standards can identify national or regional deficiencies which most likely are a function of deficiencies in programs conducted by medical schools and training hospitals. Finally, self-assessment programs provide in one way or another directions for engaging in a self-instructional program for the purpose of correcting one's deficiencies.

The problems associated with self-assessment programs are those associated with most other programs which depend on self-assessment and self-study. Participation in the program depends on the intrinsic motivation of the individual practitioner. The programs can assess the presence of and the ability to utilize knowledge but may have considerable difficulty assessing the degree to which one posses various skills and attitudes. Finally, self-assessment programs can identify whether or not a person known or can recognize what should be done but the programs cannot determine if this is in fact what the person does during the practice of his profession.

All educational procedures and delivery systems have their strengths and weaknesses. Many seem best suited for meeting rather specific educational objectives. Those that have been developed for continuing education

tend to expose persons to educational experiences but may be less able to determine, through examination, close observation or through student follow-up, whether or not the student has acquired a capability and/or an inclination to behave more competently.

Those continuing medical education programs based on short internships or tutorial experiences may be best suited for the acquisition of various types of clinical skills and knowledges. However, in such programs the certification of student competency is most apt to be based on the observation of an instructor as opposed to evidence obtained through examinations or through the audit of medical records.

Those techniques which employ the examination of the records and procedures of a medical practitioner and then develop an individualized examination to assess the physician have many virtues. However, they are expensive and time-consuming, and their ultimate success depends on subsequent self-study and self-assessment. It should be noted though, that self-study need not always be followed by self-assessment. Rather, procedures for objectively assessing cability can be substituted for self-assessment or can follow self-assessment.

Some Requirements of CME Programs

All education programs, and particularly CME programs, must be based on certain assumptions. At a minimum CME programs should be based on clearly defined goals, especially goals whose attainment is intrinsically rewarding. To the extent possible CME programs should be individualized. Thirdly, they should concentrate on correcting the deficiencies of an individual or a group of individuals having similar deficiencies. This later approach is followed at various hospitals and usually is based on an audit of medical records. Fourthly, CME programs should place the

burden of assessment and instruction on the student. Therefore, considerable use should be made of self-assessment and self-instructional material. Fifthly, CME programs must strive to be "above reproach". In practice this means that a program's education goals, the subjects covered by the program, and especially its student assessment procedures should be open to inspection. Furthermore, the award of credit should not be based on self-assessment alone or on the meeting of course requirements. Rather, credit should be awarded on the basis of demonstrated capability as determined by the use of a monitored examination process. Finally, CME programs should be flexible; they should be based on the recognition that they must employ a wide variety of educational techniques and experiences in order to meet the individual requirements of each of their students. To achieve this flexibility they should be willing to use those educational programs and materials which already exist. Too often quite acceptable programs and materials are rejected because they were "not invented here."

Why Develop a Post-Graduate School of Occupational Health?

Previous sections of this report describe the proposed development of a proposed Post-Graduate School of Occupational Health. In view of the foregoing review, one might wonder why such an Institute should be developed? What needs would it serve that are not now being served? In our judgment there are many continuing educational requirements in occupational health which are not now easily met. The various schools of public health, preventive medicine and occupational health that exist today may be suitable for those who have the time to participate in a residency

program in occupational medicine. However, these programs do not present viable alternatives for mid-career physicians.

Each year many fine workshops are conducted covering various aspects of occupational medicine. Such workshops however, cannot provide an integrated means for preparing for the board examination in occupational medicine or can they cover in depth the important functions of a plant physician or a corporate medical director. Secondly, there is no place one now can go to find out about the educational programs in occupational medicine which may be available in various sections of the country. If it did nothing else, the institute we propose would be useful as a clearinghouse for information about educational resources in occupational health, and for providing a centralized point where individuals could learn about the various CME options in occupational medicine.

Finally, it seems appropriate that professional organizations related to occupational medicine now support the development of self-assessment programs. This seems especially important because along with the development of such programs is the development of syllabi which provide self-study guidance. Using carefully developed syllabi, we propose to develop courses of instruction which would be about 90% self-instructional and which would employ self-assessment procedures similar to those now employed in many self-assessment programs for physicians. The self-study courses which we propose to develop could very readily be used in a self-assessment program for occupational health physicians.

As a further justification for the development of a Post-Graduate School of Occupational Medicine, it should be noted that educational institutions often find it difficult to serve equally well

two or more client groups. Most colleges and universities now have non-resident programs of instruction and/or conduct extensive night-school programs. Yet, in terms of instructional emphasis and funding such programs tend to be slighted. With respect to medical schools, traditionally they were concerned with undergraduate medical education. Now they are being asked to become increasingly concerned with post-graduate education--with the development and supervision of internship and residency programs. Despite their desire to serve the needs of practicing physicians, it seems doubtful if few if any medical schools will be able to emphasize continuing education for some time to come.

In the immediate years ahead it will be up to the professional medical societies, in collaboration with their clients and the agencies they serve, to develop improved CME programs. With respect to occupational medicine, it would seem that the professional societies associated with occupational medicine, medical institutions, industrial corporations, labor unions, and appropriate government agencies, must pursue cooperatively the development of improved continuing education systems in occupational health. To avoid duplication one should, whenever possible, utilize the facilities and the educational programs and expertise which reside in medical schools. However, one cannot expect the medical school community to provide leadership in the area of continuing medical education however much they might desire to do so. Medical schools can, however, be asked to persue more vigorously the development of residency programs in occupational medicine.

THE CHARACTERISTICS OF EXTERNAL DEGREE PROGRAMS

Framework of Proposed School

It is proposed to establish a free-standing institution which would provide an External Degree Program in occupational medicine. This Program would provide instruction in five core courses plus other elective courses. The Program also would utilize the instructional programs of other institutions by such procedures as (a) honoring credits obtained at other institutions and (b) helping students enroll in other institutions for certain courses not presented by the Institute. In addition, the School would award credit for certain types of prior work and professional experiences, such as the publication of a professional paper. Also, credit would be awarded for prior self-study, assuming that the student could demonstrate by examiantion that certain skills and knowledges related to occupational health had been acquired by such study. Counseling, some forms of instruction, and student evaluation would be conducted at School headquarters and also at selected regional sites within the continential USA.

Types of External Degree Programs.

Some readers may not be familiar with the various types of external degree programs which now exist nor with the instructional methods, evaluation procedures and credit-awarding procedures which they employ. What follows is a brief review of the major types of external degree programs and a brief discussion of the rationale upon which they are based.

Educational programs can be classified as traditional or non-traditional. A traditional program has rather strict residency requirements; often requires the student to attend on-campus lectures, labs, or discussion sessions;

and requires the students to study at a particular pace. Course credit is awarded on the basis of examinations and/or class participation, the preparation of reports, and student observation by the instructor as a means of assessing student mastery of course material. A traditional program usually requires both a concentration of study in a particular area (a speciality) plus a certain amount of diversified study. The instructional delivery system depends primarily on lectures and assigned readings. Laboratory work, clinical studies, and internships may play a heavy role in some degree programs.

There is no satisfactory definition for a non-traditional degree program. In general such programs are designed to meet student requirements instead of institutional requirements. Non-traditional programs usually are designed for adult learners; courses are presented during the afternoon or evening hours, often at off campus locations. Residency requirements are much less rigid but seldom are completely eliminated. Some programs may be almost completely self-instructional and designed for home study. Many programs are time-free in that the student can study at his own pace. Usually the instructional material is presented via lecture or print media. However, increasing use is being made of audio and video tapes, print media packages called instructional modules, and multi-media packages, eg., slide-tape shows. Finally, non-traditional programs are more apt to base the award of a degree or diploma on the demonstration of competencies as opposed to the meeting of formal institutional requirements. The emphasis on competencies means that students can, by successfully passing examinations, be awarded advanced standing in a program and at a few institutions may even be awarded a degree.

Currently there are over 1,000 colleges and universities in the United States that offer some type of non-traditional educational program leading to the award of a BA or BS degree. A few educational institutions offer only a non-traditional education program. Since almost all of these programs have few if any residency requirements, they have come to be known as External Degree Programs.

External Degree Programs and non-traditional programs have been established to meet the various educational needs of adult students. The following paragraphs provide brief descriptions of some single and multiple objective programs which are considered "non-traditional." Some of these programs lead to the award of a degree but others do not. Examples of each of these programs exists in the United States or in Great Britain. They are discussed here because each program provides a model which could be adopted by the Post-Graduate School of Occupational Health (PGSOH).

The Certification Model. Over the years a person may take one or two courses at each of many universities. Currently few institutions are willing to consolidate such credits towards a graduate or post-graduate degree or diploma. Furthermore, through self-study and work experiences a person may have acquired a vast store of occupationally related skills and knowledges. Again, few institutions are willing to validate the existence of these skills and knowledges and to award credit for these towards a professional degree or diploma. To meet student needs relating to these situations a few institutions have been established to consolidate credits, to examine students who claim that their self-study has been comparable to taking a degree-producing program, and to award credit for

products produced as part of one's work or professional activities. Such institutions may not provide instruction; if not they may direct students to other institutions or to resources which can be used to complete requirements towards a degree. Once a student has demonstrated competency in all areas subsumed under a particular degree program, a degree is awarded. The best known examples of such institutions are the New York Regent's External Degree Program, the University of London's External Degree Program (the grandfather of all such programs) and the Thomas E. Edison State College located in New Jersey.

The Accreditation Model. Throughout one's career a person may take a variety of courses many of which may be presented by industry, by the Federal government, by professional societies, and so on. Such courses may or may not be of high quality; most will be non-accredited in that colleges and universities will not award credit towards a degree for the successful completion of such courses. An institution can be established for the sole purpose of accrediting such courses. As an example, the Commission on Accreditation of Service Experiences (CASE) examines and accredits most courses conducted by the U.S. Armed Forces. The largest degree-awarding institution in Great Britain, the Council for National Academic Awards (CNAA), is primarily concerned with accrediting TV courses, industrial courses, and so on. For any particular student, the CNAA plans out a degree program consisting of a mixture of traditional and non-traditional courses which are acceptable to the Council. After taking one or more courses on a particular subject the student presents himself for examination. After the student has been examined satisfactorily over an appropriate variety of subjects he is

awarded a degree. Such an institute usually does but need not award a degree. They could function solely as an accrediting agency.

The Facilitation Model. Most persons need help when planning their educational program. This is particularly true of adults who are continuing their education in mid-career. They need counseling regarding their educational goals and how to achieve these goals. They need someone who can serve both as a counselor and an advocate. A few institutions have been formed for the sole purpose of providing counseling, diagnostic, facilitation and advocacy services to students. Such institutions may not conduct instruction. Rather, they identify instructional resources -- colleges, universities, accredited industrial programs, competent tutors; they identify degree requirements for various professions and various institutions; they help students enroll in the programs of other institutions; they provide surveillance over courses and programs to assure that the programs they recommend are of high quality; they may even promote the development of certain programs and courses at a single institution or a consortium of institutions. The Central New York Learning Services which operates out of Syracuse University is a prime example of an organization operating in keeping with the facilitation model.

The Instructional Model. It is possible to establish an institute which prepares and administers instructional material but which does not grant a degree or diploma. Such institutions are rare and examples are more apt to be found within a large industrial organization. Various educational courses and programs offered by the government and by the

the Armed Services do not award degrees but may award a certificate of completion. Attendance at such courses may be a requirement for promotion. Sometimes these programs and courses may have been accredited by an outside agency. Many community colleges and county governments provide adult educational courses which are not part of a degree-producing program. It would be quite feasible therefore to establish an institute solely for the purpose of conducting workshops and for preparing and disseminating instructional material covering topics of particular importance to practitioners in occupational medicine.

The Eclectic Model. Many non-traditional programs attempt to meet a variety of adult learner requirements. They consolidate credits and award credits by examination. They provide intensive counseling, help the student plan his education program and suggest various ways to fulfill his educational goals. They make every effort to assure that their own courses can be accredited and that other courses to which they refer students also are accredited. They provide a variety of instruction, often using self-instructional modules and other advanced instructional techniques; and of course, they award a degree or diploma. Such a program can truely be called an External Degree Program. It is this type of program that we propose to develop and employ at the Post-Graduate School of Occupational Health.

Programs for Single or Multiple Institutions. Before returning to the specifics of the External Degree Program we propose to develop, we should mention that non-traditional programs can be conducted by a single institute or by a consortium of colleges and universities. The

University Without Walls (UWW) is a consortium of institutions with headquarters at Antioch College. The distinguishing feature of the UWW is that students can study at any one of the consortium institutions and their credits combined for degree-awarding purposes. Two similar consortia are being developed for the Statewide College and University Systems of California. Many other states have non-traditional degree programs where students can study at most colleges or universities within the state. Nova University, headquartered in Florida, is in reality a consortium of Southern colleges and universities. Nova University awards a PhD degree based on satisfactory study at any one or more of its consortium members. We mention these consortia because, while we propose that the PGSOH be capable of standing on its own, we also propose to honor credits from other institutions and would hope to work out arrangements for using resources at other institutions as well as at industrial and government facilities.

We intend to provide instructional materials and resources as needed to meet the requirements of our clientele. But, we will readily use any other resources which in our judgment will meet our client's needs and will mesh with our instructional program.

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BACKGROUND INFORMATION RELATED TO PHASES OF INSTITUTIONAL DEVELOPMENT

Course Development Time Estimates

A. Course Characteristics

1. Courses will be worth one, two or three credits
2. Each credit-worth of course material will require about 40 hours of student study/test/orientation/review time, distributed as shown below:

	3-Credit Course	2-Credit Course	1-Credit Course
Course orientation	7hrs	7hrs	7hrs
Review sessions	14	7	3
Study of course modules	72	48	24
Test Taking: module pre-tests	6	4	2
module post-tests	9	6	3
Criterion testing by Institute	12	8	4
	120 hrs	80 hrs	40 hrs

B. Course Development Times

1. Before beginning to develop modularized course material each professor will attend an 80-hour school-sponsored workshop on how to identify training objectives, how to identify appropriate test questions, how to format test questions, how to select and reference appropriate study material, and so on.
2. During the development of course material a course review committee composed of outside consultants will help identify training objectives, suggest and review test items, suggest and review instructional content, and so on. These committees will meet as follows:
   - 3 meetings (120 hrs) for a 3-credit course
   - 2 meetings (80 hrs) for a 2-credit course
   - 2 meetings (40 hrs) for a 1-credit course
3. An individual instructional module will contain about 7¼ hours-worth of study and test material, distributed as follows:
   - 6 hrs of study material (modules for the most part will contain a list of reference material to be studied)
   - ½ hr of pre-test material
   - 3/4 hr of post-test material
4. A fully developed course will contain 50 percent more modules than required to meet minimum study/test hour specifications for that course.
   - a 3-credit course will contain 18 modules; 12 must be studied
   - a 2-credit course will contain 12 modules; 8 must be studied
   - a 1-credit course will contain 6 modules; 4 must be studied

5. It should take about 80 hours to develop one course module assuming that:
   - a content expert is developing the module
   - the course developer has completed the School's workshop on the development of course modules
   - the course developer is beginning from scratch and is not re-formatting previously developed course material
   - an instructional technologist provides assistance to the developer in a ratio of about one hour for each ten provided by the developer
   - the course developer is provided some guidance by a curriculum or course content committee
   - 15 to 20 percent of the development time will be spent revising each module in accordance with suggestions by a course content committee

6. Based on the foregoing assumptions course development time is estimated to be as follows:

	3-Credit Course	2-Credit Course	1-Credit Course
Develop course modules	1440 hrs	960 hrs	480 hrs
Develop course orientation	16	16	8
Develop course reviews	16	16	8
Organize criterion tests	8	8	4

Course Development Schedule Estimates

1. Soon after School funding a group of five professors would be hired.
   a. Each would develop a 3-credit course during the first 18 months
   b. Each would develop a 2-credit elective course during the next 12 months
2. At the beginning of the second year of the School a second group of five professors would be hired.
   a. Each would develop a 2-credit elective course during the next 12 months
   b. Each would develop a 1-credit elective course during their second year of employment.
3. At the beginning of the third year of the School a third group of four professors would be hired.
   a. Each would develop a 2-credit elective course during the next 13 months
   b. Each would develop a 1-credit elective course during their second year
4. Following the fourth year of the School, a total of 47 credit-hours of instruction would be available. During the fifth year and thereafter all 14 professors would be available for consulting on a 50 percent basis. Should it not be possible to sell that amount of consulting time:
   a. additional elective courses could be developed, assuming that a demand existed for them. It would take an estimated 63 days to develop a 1-credit course.
   b. an appropriate number of professors would be laid off and the remainder given an increased course administration load.

Table VI ESTIMATED SCHEDULE OF ACTIVITIES FOR FIVE PROFESSORS HIRED AT BEGINNING OF FIRST YEAR OF THE SCHOOL

1st Year

Weeks	Work Activities	Work Hrs
1-8	Complete recruiting of 5 professors	320
9-10	Select course review committee members Conduct workshop on module development	80
11-12	Gather course background material	80
13-14	Rough out blocks of course	80
15	First meeting of review committees	40
16-17	Develop outline of course syllabus	80
18-37	Develop course modules	500
38	Second meeting of review committees	40
39-52	Develop course modules	360
18-52	Consulting (maximum of 20 days)	160
	Time off (5/6 of full allotment of 408 hrs)	340

Summary of Yearly Activities

Course Development

Each professor would spend circa. 860 hrs. on course development and should produce circa. 75.25 hours of course material

Consulting Activities

20 days per professor

Teaching Activities

None

2nd Year

Weeks	Work Activities	Work Hrs
1-10	Develop course modules	300
11	Third meeting of course review committee	80
12-24	Complete course development	376
25-26	Complete preparation for students	40
27-52	Function as Half-time instructor: present 1 course to 30-50 students	356
	Begin preparation of elective course	220
1-52	Consulting, mostly in 2nd half of year	300
	Time off	408

Summary of Yearly Activities

Course Development

- o 59.15 hrs of material 1st half of year
- o 19.25 hrs of material 2nd half of year

Consulting Activities

- o 10 days during 1st half of year
- o 27.5 days during 2nd half of year

Teaching Activities

- o none 1st half of year
- o capacity to handle 50 students in one course or 25 students in two courses.

(Continued)

Table VI (continued)

3rd Year

Weeks	Work Activities	Work Hrs
1-26	Function as half-time course administrator o present 1 course to 30-50 students	356
	Complete development of 1-credit course	294
	o attend course review committee meetings	40
	Consulting	146
27-52	Function as half-time course administrator o present 1 core course and 1 elective	407
	Consulting	429
	Time off	408

Summary of Yearly Activities

Course Development
- o 25.75 hours of material during 1st half

Consulting Activities
- o 71.75 days, circa 53 during 2nd half of year

Teaching Capacity
- o Counselor to 25 students at a time
- o Administer course to 50 students at one time

4th Year

Weeks	Work Activities	Work Hrs
1-52	Function as half-time course administrator	816
	Consult on a half-time basis	856
	Time off	408

Course Development
None. Maintain courses only

Consulting Activities
Up to 107 days

Teaching Activities
Same as for 3rd Year

Subsequent years same as fourth year.

Table VII ESTIMATED SCHEDULE OF ACTIVITIES FOR FIVE PROFESSORS HIRED AT BEGINNING OF SECOND YEAR OF SCHOOL, AND, FOUR PROFESSORS HIRED AT BEGINNING OF THIRD SCHOOL YEAR

1st Year

Weeks	Work Activities	Work Hrs
1-2	Complete recruiting started previous year Complete selection of elective course topics	80
3-4	Conduct workshop on module development	80
5	Select course review committee	40
6-7	Gather course background material	80
8-9	Rough out blocks of course	80
10-11	Develop outline of course syllabus	80
12	1st review committee meeting	40
13-32	Develop course modules	560
33	2nd review committee meeting	40
34-52	Develop course modules	500
13-52	Consulting (maximum of 20 days)	160
	Time off (5/6 of full allotment of 408 hrs)	340

Summary of Yearly Activities

Course Development
96.1 hours of instructional material

Consulting Activities
20 days mostly during 2nd half of year

Teaching Activities
None

2nd Year

1	3rd review committee meeting	40
2-4	Revise and finalize course material	120
5-52	Function as half-time instructor and administer elective course	750
	Function as 1/4 time course developer and develop a 1-credit elective course	602
	Consulting activities (20 days)	160
	Time off	408

Course Development
54.6 hours of course material

Consulting Activities
20 days distributed throughout year

Teaching Activities
25 students in 2 course, or equivalent

3rd Year

1-8	Complete development of elective course	80
1-52	Function as half-time Instructor	816
	Consult up to 97 days	776
	Time off	408

Course Development: 7.25 hours of material

Consulting Activities: 97 days

Teaching Activities: same as for 2nd year

4th & Subseqeunt Years

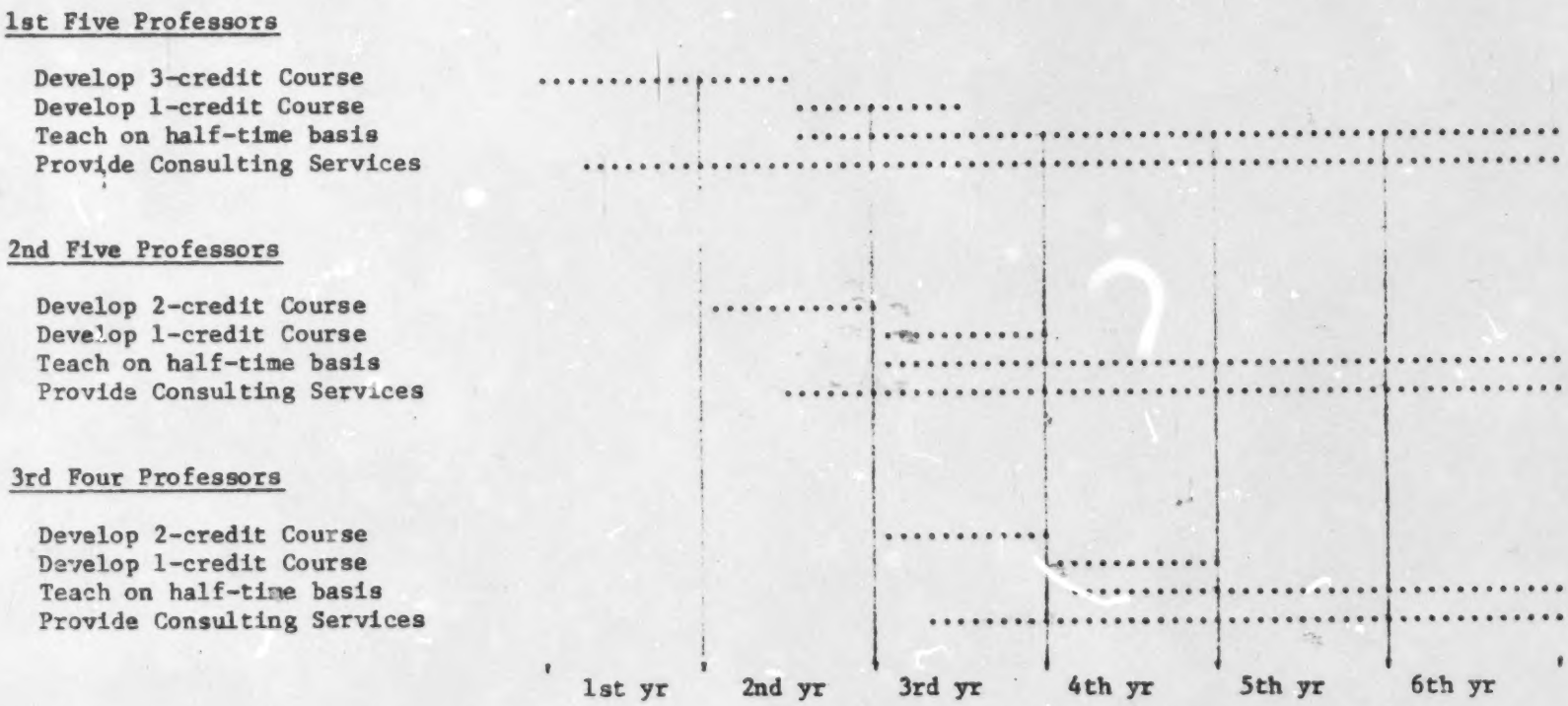
1-52	Function as half-time instructor	816
	Consult on a half-time basis	856
	Time off	408

Course Development: None. Maintain courses only

Consulting Activities: up to 107 days

Teaching Activities: same as for 2nd year

Table VIII SUMMARY OF SCHOOL PROFESSOR ACTIVITIES



Professor Workload Estimates

1. School professors would play four roles -- as a:
   - course developer
   - student counselor
   - course administrator
   - consultant to industry/government

2. A professor would be hired to develop and to administer a course. After his assigned courses had been developed he would be assigned as counselor to a certain number of students, the number depending on the percentage of time he chose to devote to course administration. Persons functioning as course administrators also would have to function as student counselors.
   - within limits each professor could divide his workload among three major functions -- course developer, course administer/student counselor, or consultant
   - for purposes of developing an action plan, the workload estimates assume that all professors eventually devote 50 percent of their time to course administration/student counseling activities

3. Workload sequence by year of employment
   a. During the first year of employment each professor would be involved primarily in course development with a few days set aside for providing consulting services.
   b. During the second year of employment the typical professor would be teaching 50% of the time, developing a second course 25% of the time, and consulting 25% of the time
   c. During their third year of employment most if not all professors would be teaching 50 percent of the time and consulting 50 percent of the time.
   d. As part of their normal course administration duties, professors would update courses under their jurisdiction. Time has been set aside for this (see Table IX).
   e. A professor teaching on a half-time basis would:
      - be the advisor to 25 or less students at any one time
      - be responsible for administering course work to 50 or less students at any one time -- one class of up to 50 students, or, 2 classes of up to 25 students.

Table IX

Breakdown of Instructor/Consultant Activities in Terms of Percent of Time Per Year Working as an Instructor (based on 2080 working hours per year)

Percent of Time Working as an Instructor	100%	75%	50%	25%	0%
No. of Assigned Students	50	40	25	10	0
No. of Courses to Administer	3	2	2	1	0
Staff Activities					
Student Advisor	300hrs	240hrs	150hrs	60hrs	0hrs
Conduct Courses					
Orientation	120	80	80	40	0
Mid-Term seminars/ testing	120	80	80	40	0
End-of-Term seminars/ testing	120	80	80	40	0
Grade end-of-module exams (12 per 3-credit course; 20" per exam)	600	320	200	40	0
Course Maintenance	210	160	85	50	0
Committee work/staff meetings	120	120	80	80	80
Portfolio Examination	80	80	60	60	0
Consulting Services	0	512	856	1256	1592
Miscellaneous	2	0	1	6	0
Staff Benefits					
Leave (36 days/year)	288	288	288	288	288
Holidays (10 days/year)	80	80	80	80	80
Professional Meetings (5 days/year)	40	40	40	40	40

Table X

Breakdown of Course Developer Activities in Terms of Percent of Time Per Year Working as a Course Developer, Instructor, or Consultant (Based on 2080 working hours per year)

Percent of Time Working as:					
a Course Developer	100%	75%	50%	50%	25%
an Instructor	--	--	--	25	50
a Consultant	--	25	50	25	25
Staff Activities					
Course Development	1552hrs	1164hrs	776hrs	864hrs	440hrs
Student Advisor	--	--	--	60	150
Conduct Courses					
Orientation	--	--	--	40	80
Mid-term Seminars/ testing	--	--	--	40	80
Grade end-of-module exams	--	--	--	40	200
End-of-Term Seminars/ testing	--	--	--	40	80
Course Maintenance	--	--	--	40	60
Committee work/staff meetings	120	120	120	80	80
Portfolio Examination	--	--	--	60	60
Consulting Services	--	388	776	408	440
Miscellaneous	--	--	--	--	2
Staff Benefits					
Leave (36 days/year)	288	288	288	288	288
Holidays (10 days/year)	80	80	80	80	80
Professional Meetings (5 days/year)	40	40	40	40	40

BACKGROUND INFORMATION RELATED TO EXPENDITURE AND REVENUE PROJECTIONS

Salary and Fringe Benefit Costs for School Staff

A. Salaries: Professional

1. As currently conceived the School eventually would employ seventeen professionals:
   - a President
   - Director, Business Directorate
   - Director, Educational Technology & Support Directorate
   - (Director, Educational Directorate. This position would remain unfilled but would be handled by the President)
   - 14 Professors
2. 1976-77 starting salaries are estimated to be:
   - $40,000 -- President
   - $35,000 -- Average for all other 16 professionals
3. Salaries are in keeping with average salaries for Department Heads and full-time Professors in Schools of Public Health or Community Medicine during 1974-75 Academic year [J.Med.Ed, 50(7): 696-698]
4. Salaries estimates assume that base salaries will increase by 5% per year.

B. Salaries: Non-Professionals

1. Estimates are based on best estimate at the going rate for administrative clerical and technical personnel in the Washington, DC area during 1975-76.
2. Salary estimates assume that base salaries will increase by 7% per year.

C. Fringe Benefits

1. Fringe benefits will be arranged so that they are not worth more than 20% of base salary. Fringe benefits do not include leave and holidays (see below).

D. Official Work Year

1. The official work year would consist of 210 days and base salary would be pro-rated over this number of days. In addition, the employee would receive 51 days of leave and holidays, distributed as follows:
   a. 10 days of holidays
   b. 36 days of vacation
   c. 5 days for professional meetings/staff training
2. Placing all time off in an un-paid category has the effect of increasing daily rates and course fees but reduces fringe benefit and overhead costs. This can be of an advantage to a non-for-profit organization.

Table XI SUMMARY OF ESTIMATED MATERIAL AND SERVICE COSTS DURING FIRST SIX YEARS OF OPERATION

1.	Consultants	5,000	1,000	---	---	---	---
2.	Office Furniture, Equipment	10,000	8,000	2,000	2,000	2,000	2,000
3.	Production Department Equipment	5,000	3,000	2,000	1,000	1,000	1,000
4.	Travel & Per Diem (Field Instruction)	5,000	10,000	15,000	20,000	20,000	22,000
5.	Publicity	7,500	7,500	5,000	5,000	5,500	5,500
6.	Space Rental for Field Instruction	---	1,000	2,000	2,500	3,000	3,500
7.	Purchase of Library materials and learning aids/material	7,500	5,000	5,000	5,000	5,500	6,000
8.	Telephone	1,000	1,500	2,000	2,500	3,000	3,500
9.	Postant (heavy)	750	2,000	3,000	4,000	4,500	5,000
10.	Office supplies @ $200/year/employee	3,600	5,800	6,800	7,600	7,800	7,400
11.	Production Center Supplies	1,000	3,000	3,000	2,500	2,000	2,000
12.	Course Review Committees	35,000	52,500	54,300	43,750	23,750	15,000
		81,350	100,300	100,100	95,850	78.050	72,900

Basis for Revenue Projections Based on Student Enrollment

A. Enrollment estimates

1. AOMA membership is about 3500 and seems likely to expand
2. Other professional groups should find that certain of the School's courses are of benefit to their membership.
3. It seems likely that there will be increased pressure for companies to assure that their plant physicians are Board certified.
4. The enrollment estimates assume that the student body will expand slowly and that in 1981 the student enrollment of a maximum of 350 would be well under 10 percent of the AOMA membership.
5. Tuition fees will be paid for by employers.

B. Student workload estimates

1. A student, to receive a diploma, would have to earn 30 credits within a four-year period.
   - it is assumed that each student would earn an average of 7½ credits per year.
     -- about 6 of these would be for School courses
     -- about 1½ of these would come from credit-by-examination, transfer of credit, credit for prior professional work, etc.

C. Student Capacity Estimates

1. After the fourth year of the School there would be 14 Professors working 50% of their time as course administrators.
   - Each professor is expected to carry a student counseling load of 25 students when working as a half-time course administrator (Table IX).
   - 14 Professors working as half time course administrators can handle 350 students

D. Credit Hour Capacity Estimates

1. Each half-time course administrator would be responsible for up to two courses at a time and up to 50 students at a time. In addition, he would have time to serve on student examination committees, and so on. Therefore, each professor working as a half-time course administrator would have the capacity to handle 50 students per year or the equivalent of 375 credit hours-worth of instruction.

Table XII Projected Hiring and Salary Schedules for School Staff

	Degree of Employment[1]						Beginning Salary (1976)	Estimated Salary (x $1000)					
	1st	2nd	3rd	4th	5th	6th		1st	2nd	3rd	4th	5th	6th
President's Office													
President	F	F	F	F	F	F	$40,000.	40.0	42.0	44.1	46.3	48.5	50.7
Secretary	F	F	F	F	F	F	$13,000.	13.0	13.9	14.9	15.9	17.0	18.2
Educational Directorate													
Dean of Education (Filled by President)	-	-	-	-	-	-							
Counseling & Admissions													
Admissions Supervisor		3/4	F	F	F	F	$14,000.	--	11.0	16.1	17.2	18.4	19.7
Academic Records Clerk	-	-	-	F	F	F	$9,000.	--	--	--	10.9	11.7	12.3
Counselors (listed as course developers)													
Secretary	-	1/2	1	1	1	1	$11,000.	--	5.9	12.6	13.5	14.4	15.4
Instructional Management Dept													
Supervisor	-	1/2	1	1	1	1	$14,000.	--	11.0	16.1	17.2	18.4	19.7
Distribution Clerk	-	-	1/2	1	1	1	$9,000.	--	--	5.1	10.9	11.7	12.5
Distribution Clerk	-	-	-	-	1	1	$8,000.	--	--	--	--	10.2	11.0

[1] F full-time employment; 1/2 half-time employment, etc.

Table XII (cont.)

	Degree of Employment						Beginning Salary (1976)	Estimated Salary (x $1000)					
	1st	2nd	3rd	4th	5th	6th		1st	2nd	3rd	4th	5th	6th
Business & Finance Office													
Director	F	F	F	F	F	F	$35,000.	35.0	36.7	38.6	40.5	42.5	44.6
Secretary	F	F	F	F	F	F	$11,000.	11.0	11.8	12.6	13.5	14.4	15.4
Billing, Purchasing & Accounting Office													
Supervisor, Billing	-	¾	F	F	F	F	$14,000.	--	11.3	16.1	17.2	18.4	19.7
Billing Clerk	-	-	-	F	F	F	$9,000.	--	--	--	10.9	11.7	12.5
Supervisor, Purchasing/ Reimbursement	-	¾	F	F	F	F	$14,000.	--	11.3	16.1	17.2	18.4	19.7
Pur. & Reimb. Clerk	-	-	-	F	F	F	$9,000.	--	--	--	10.9	11.7	12.5
Supervisor, Accounting	-	¾	F	F	F	F	$14,000.	--	11.3	16.1	17.2	18.4	19.7
Accounting Clerk	-	-	-	-	-	-	$9,000.	--	--	--	10.9	11.7	12.5
Personnel Office													
Personnel Officer (filled by Director, B&F Office)													
Building Services													
Head, Bldg. Services	½	F	F	F	F	F	$11,000.	--	5.9	12.6	13.5	14.4	15.4

Table XII (cont.)

	Degree of Employment						Beginning Salary (1976)	Estimated Salary (x $1000)					
	1st	2nd	3rd	4th	5th	6th		1st	2nd	3rd	4th	5th	6th
Office of Educitional Technology & Support													
Director	F	F	F	F	F	F	35.0	35.0	36.7	38.6	40.5	42.5	44.6
Secretary	F	F	F	F	F	F	11.0	11.0	11.6	12.6	13.5	14.4	15.4
Training Resources Center													
Librarian	½	F	F	F	F	F	11.0	11.0	11.8	12.6	13.5	14.4	15.4
Education Materials Production Center													
Manager(& Editor)	¾	F	F	F	F	F	16.0	12.0	17.1	18.3	19.6	21.0	22.5
Pressman	¾	F	F	F	F	½	14.0	3.5	15.0	16.1	17.2	18.4	19.7
Copy Preparer	½	F	F	F	F	F	9.0	4.5	9.6	10.2	10.9	11.7	12.3
Copy Preparer	½	F	F	F	F	-	9.0	4.5	9.6	10.2	10.9	11.7	12.3
Copy Preparer(AV)						-	13.0	3.3	3.5	1.9	2.0	2.1	--
Instructional Development Department													
Ed. Technologist(Director)													
Course Developers/Professors													
1st year (N=5)	F	F	F	F	F	F	35.0	175.0	183.5	193.0	202.5	212.5	223.0
2nd year (N=5)	-	F	F	F	F	F	35.0	--	175.0	183.5	193.0	202.5	212.5
3rd year (N=4)	-	-	F	F	F	F	35.0	--	--	140.0	145.8	154.4	162.0